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A method of and a network for handling Wireless Session Protocol (WSP) sessions.

Title

A method of and a network for handling Wireless Session Protocol (WSP) sessions.

Technical Field of the Invention

The invention relates to a new method and system for a session service in a wireless session protocol (WSP) between a user and a server terminal.

Background of the Invention

The Wireless Application Protocol (WAP) is a result of continuous work to define an industry wide standard for developing applications over wireless communication networks. WAP is disclosed in the Wireless Application Protocol Architecture Specification; Version 0.9; by Wireless Application Protocol Architecture Working Group; http//www.wapforum.org/docs/WAPArch-Sep-97.pdf.

The scope for the WAP working groups is to define set of standards to be used by service applications. The wireless market is growing very quickly, and reaching new customers and services. To enable operators and manufacturers to meet the challenges in advanced services, differentiation and fast/flexible service creation WAP defines a set of protocols in transport, session and application layers.

The Session layer protocol family in the WAP architecture is called the Wireless Session Protocol, WSP. WSP provides the upper-level application layer of WAP with an interface for session services and management. One example of a session service is a connection-mode service that operates above a transaction layer protocol called Wireless Transport Layer (WTP), see also Wireless Application Protocol: Wireless Transport Protocol specification, draft version 16-January-1997, by Wireless Application Protocol Transport Working Group, http//www.wapforum.org/docs/WTP-Spec.pdf.

Another session service may be a connectionless service that operates above a secure or non-secure datagram service.

The Wireless Session Protocols comprises one protocol most suited for browsing applications (WSP/B). WSP/B provides HTTP 1.1 functionality and incorporates new features such as long-lived sessions, a common facility for data push, capability negotiation, and session suspend/resume. HTTP 1.1 is disclosed in Fielding, R., et. al., "Hypertext Transfer Protocol—HTTP/1.1", RFC 2068, UC Irvine, January 1997, http://www.internic.net/rfc/rfc2068.txt. The protocols in the WSP family are optimised for low bandwidth bearer networks with relatively long latency.

The WAP Architecture is very similar to the Internet Architecture. Fig.1 shows a comparison between the Internet Architecture 10 and the WAP Architecture 20. The Internet Architecture 10 comprises a Hypertext Markup Language (HTML) 12, e.g. Java Script, a Hypertext Transfer Protocol (HTTP) 14, Transport Layered Security (TLS) / Secure Sockets Layer (SSL) 16, and a Transport Configuration Protocol (TCP) / User Datagram Protocol (UDP) 18. The Internet Architecture 10 is well known prior art, and is disclosed in e.g. in US-A-5,657,390. The WAP Architecture 20 comprises a Wireless Application Protocol (WAE) 22 corresponding to HTML 12, a Wireless Session Layer (WSP) 24 corresponding to HTTP 14, a Wireless Transport Layered Security (WTLS) 26 corresponding to TLS / SSL 16, and a Wireless Transport Layer (WTP) 28 corresponding to TCP / UDP 18. Further, the WAP Architecture comprises different bearers 29 like e.g. SMS, USSD and CDMA 30. There is also a possibility to implement different kind of services and applications in the WAP Architecture, e.g. Value Added Services (VAS). The WAP Architecture 20 is well known prior art and more information about the different blocks WAE, WSP, WTLS, WTP and bearers is found in e.g. http://www.wapforum.org/docs/technical.htm.

The present invention relates to WSP, which provides a means for organized exchange of content between co-operating client/server applications. Specifically, it provides the applications with a means to:

a) establish an optionally secure, reliable session from client to server, and release the session in an orderly manner;

b) exchange content between client and server;

c) suspend and resume the session.

In addition, WSP also supports a non-confirmed session service. The connectionless session service can be used over unreliable transport when applications do not care about confirmation. The non-confirmed service is accessed outside the context of an established session.

Summary of the Invention

An object of the invention is to provide a method of handling Wireless Session Protocol (WSP) sessions in such a way that the amount of redundant information is reduced.

This is obtained by a method of handling Wireless Session Protocol (WSP) sessions between a wireless communication terminal and a corresponding server, wherein the communication terminal initiates a session by forwarding a request of data to the server, said requests comprises an identification of the requested data and a communication terminal identification number provided by the server; the server, when receiving a request containing a communication terminal identification number, recalls user profile information from an associated database memory corresponding to said communication terminal identification number, and said user profile information indicates a data format which shall be handled by the communication terminal; and the server replies the request by forwarding the requested data in the format defined by the user profile information. Hereby the server unit is able to store the user profile information for a period and to recall this information when appropriate. The requesting communication unit does not have to transmit

information about its user profile once these are stored in the database memory of the server. These informations would otherwise have to be transferred in every session, and this would lead to an unacceptable overhead with up to 50 percent of data transferred in the request being redundant user profile information. Once the server has stored the user profile information it provides the communication terminal with a communication terminal identification number that uniquely identifies the communication terminal.

According to the preferred embodiment of the invention the server only stores the user profile information for a predetermined period of time, e.g. 3 hours or 3 days. The period of time may be differentiated in dependence of the kind of subscription the user has. The server deletes the user profile information from the database memory upon expiration of said period of time. In order to avoid double use of the same communication terminal identification number the server informs the communication terminal about the duration of this period, whereby the terminal knows when the period has expired. When the period has expired and the communication terminal starts a new session its has to transfer it user profile once more. When the server has stored the user profile information once more it provides the communication terminal with a new communication terminal identification number that uniquely identifies the communication terminal for a new period.

The invention furthermore relates to a method of handling Wireless Session Protocol (WSP) sessions between a wireless communication terminal and a corresponding server, wherein: the communication terminal initiates a session by forwarding a request of data to the server, said requests comprises an identification of the requested data and a header indicating the data format which shall be handled by the communication terminal; the server upon reception of a request generates a communication terminal identification number and stores said header associated with said communication terminal identification number; said server replies the request

by forwarding the requested data and the communication terminal identification number to the requesting communication terminal; said communication terminal stores the communication terminal identification number in a memory. The server stores the user profile information included in the header and this information may later on be used when a new session is initiated.

The invention furthermore relates to a wireless communication network for handling Wireless Session Protocol (WSP) sessions between a wireless communication terminal and a corresponding server connected via said network, comprising means in the communication terminal for initiating a session by forwarding a request of data to the server, said requests comprises an identification of the requested data and a communication terminal identification number provided by the server; a database memory connected to the server in order to store user profile information based on the communication terminal identification number received in the request, said user profile information indicates the data format which may be handled by the communication terminal; processing means in order to recall the stored user profile information corresponding to the communication terminal identification number and for replying to the request by forwarding the requested data in the format defined by the user profile information via transmission means to the communication terminal. Such a network will be especially useful when it is used as a cellular network, e.g. a GSM network and the bearer for the request is the standard data transfer or a chain of SMS messages. The savings in cost for a sessions will be important for the user since the saving of the re-transmission of resending the user profile information several times may reduce the number of transmitted messages with up to 50 %.

When the communication unit is aware of that the user profile information is not stored in the database memory of the server, it has to include a header in the request indicating the data format which shall be handled by the

communication terminal. The processing means in the server is arranged to derive the user profile information from the header, to store the user profile information in said database memory, to generate an associated communication terminal identification number; and to forward the communication terminal identification number via said transmission means to the communication terminal. This communication terminal identification number will be valid for the next session if that occurs within the period set by the server.

According to the invention there is provided a server unit for use in a wireless communication network for supporting Wireless Session Protocol (WSP) sessions, comprising input means; output means; and processing means controlling the input and output means and a database memory. The database memory contains user profile information for a plurality of communication terminals, said user profile information indicates the data format which may be handled by the communication terminal. The input means are adapted to receive a request for data from a communication terminal, said request initiates a session and comprises an identification of the requested data and a communication terminal identification number. The processing means recalls the stored user profile information by means of the communication terminal identification number received in the request, and the processing means replies to the request by forwarding the requested data in the format defined by the user profile information via said output means. Very often it will be the network operator to which a phone user subscribes that operates the WSP server, too. In practice it can occur that it is the network server that generates the communication terminal identification number to the WSP server, but as far as both the network server and the WSP server are controlled by the same operator these servers may be regarded as an entity. This does also count when WSP server operator decides to use communication terminal identification numbers otherwise existing in the system.

When the communication terminal includes a header in the request indicating the data format which may be handled, the processing means of the server has to derive the user profile information from the header, to store the user profile information in said database memory, and to generate an associated communication terminal identification number. Furthermore the processing means forwards the communication terminal identification number via said output means to the communication terminal.

Brief Description of the Drawing

The invention will be described in greater detail in the following by way of example only and with reference to the attached drawings, in which

Fig. 1 shows a comparison between the Internet Architecture and the WAP Architecture; and

Fig. 2 schematically shows a connection between a communication terminal and a server according to a preferred embodiment according to the present invention.

Detailed Description of preferred embodiments

Fig. 2 shows a wireless communication network 90 for handling Wireless Session Protocol (WSP). The network 90 comprises a wireless communication terminal 100, comprising an antenna 110, and an server 220 connected to a server antenna 200. The communication terminal 100 is for example an ordinary cellular phone provided with a Wireless Application Protocol (WAP). The server is provided by an operator and can handle WAP applications. The WAP comprises the WSP which the present invention is based on. How the WSP is implemented in WAP is described in detail in the Wireless Application Protocol Architecture Specification; Version 0.9; by Wireless Application Protocol Architecture Working Group; http//www.wapforum.org/docs/WAPArch-Sep-97.pdf.

The server 220 includes processing means 221 or a CPU controlling the activity of the server 220. The server 220 will in general be sited at a network operator and therefor not be directly connected to the antenna. However, the hardware between the server 220 and the antenna is not important to understand the invention and these part are therefore omitted to improve the clarity of the invention. The server receives the request via input means 224. The processing means 221 looks for a heading containing user profile information or a communication terminal identification number in the request.

If the request contains a heading containing user profile information these information are stored in a database memory 222 for use when the server 220 replies. If the request contains a communication terminal identification number the corresponding user profile information is recalled from the database memory 222 when the request is responded. The server 220 is ready for responding the processing means 221 transmits the response via output means 223 to the communication terminal 100 via said output.

When using a connection less WSP session, it is not possible to store WSP headers as a part of a session state at both ends of the connection peers, i.e. between the terminal 100 and the server 220. Therefore, all headers must be re-send every time a WAP user agent requests a resource from the server 220 via a WAP proxy. Over a low bandwidth, high latency bearer, such as Short Messaging Services (SMS), this leads to an unacceptable overhead (only 50 – 75 % of the data send is pay-load). The present invention solves this problem by using a cookie for storing session headers on the server within the user agent profile (uaprof) resource file defined by WAP. The idea is, that a request of data 120, conveys headers to the server 220, after which the user agent (client) uses a file-handle to reference the information stored on the server. It is also possible for the operator to provide some pre-defined file-handle in the communication terminal, i.e. the operator has some cookies on the server. Therefore, it is not always necessary for the user agent to define a header, which saves a lot of time for the user agent.

If the operator has provided some cookies on the server, the method is disclosed by the following steps by reference to Fig.2:

- the communication terminal 100 initiates a session by forwarding a request 120 of data to the server 220, the request 120 comprises an identification of the requested data and a communication terminal identification number provided by the server 220;
- the server 220, when receiving the request 120 containing a communication terminal identification number, recalls user profile information from an associated database memory (not shown) corresponding to the communication terminal identification number, and said user profile information indicates a data format which shall be handled by the communication terminal 100; and
- the server 220 replies 130 the request by forwarding the requested data 120 in the format defined by the user profile information.
- the communication terminal can initiate a session comprising a header in a request 140 indicating the data format which can be handled by the communication terminal 100;
- the server 220, when receiving the request 140 containing a header, can derive the user profile information from this header and store the user profile information in said database memory and generate an associated communication terminal identification number; and
- the server 220 can forward the communication terminal identification number in a reply 150 to the communication terminal 100.

As an alternative method of the invention, which do not require the server to have pre-defined cookies is disclosed by the following steps by reference to Fig.2:

- the communication terminal 100 initiates a session by forwarding a request 140 of data to the server 220, the request 140 comprises an identification of the requested data and a header indicating the data format which shall be handled by the communication terminal 100;

- the server 220 upon reception of the request 140 generates a communication terminal identification number and stores said header associated with said communication terminal identification number;
- said server 220 replies 150 the request by forwarding the requested data and the communication terminal identification number to the requesting communication terminal 100;
- the communication terminal 100 stores the communication terminal identification number in a memory (not shown).

Further, when the communication terminal 100 once again initiating a session, and forwards a request 120 of the same data as in the first step, the request 120 includes an identification of the requested data and the communication terminal identification number received from the server 220. When the server 220 receives the request 120, it recalls the header from the database memory which corresponds to said communication terminal identification number, and replies 150 to the communication terminal 100.

In both of the methods it is possible for the server to define a period of time in which the user profile information can be stored in the database memory. It is also possible for the server to delete the user profile information from the database memory upon expiration of within the defined period of time. The time may for example be 3 hours or 3 days. The period of time may be differentiated in dependence of the kind of subscription the user has. In order to avoid double use of the same communication terminal identification number the server informs the communication terminal about the duration of this period, whereby the terminal knows when the period has expired. When the period has expired and the communication terminal starts a new session its has to transfer it user profile once more. When the server has stored the user profile information once more it provides the communication terminal with a new communication terminal identification number that uniquely identifies the communication terminal for a new period.

The header data structure used by the terminal and the server comprises a sequence of header fields, followed by e.g. image-type-specific data and actual image data. The header field comprise an image type identifier of a multi-byte length (*TypeField)*, an octet of general header information (FixHeaderField), followed by zero or more extension header fields (*ExtField)*. The extension headers may be of type binary *00* through binary *11*. A header of Type 00 could e.g. indicate a multi-byte bitfield used to specify additional header information. The first bit may be set if a type 00 extension header is set if more data follows. A header of the Type 11 indicates a sequence of parameter/value pairs. These can be used for optimisations and special purpose extensions, e.g., animation image formats. The "parameter size" tells the length (1-8 bytes) of the following parameter name. The "value size" gives the length (1-16 bytes) of the following parameter value. The concatenation flag indicates whether another parameter/value pair will follow after reading the specified bytes of data. The actual organisation of the image data depends on the image type.

The invention is not limited to the above described and in the drawing shown an example of embodiments but can be varied within the scope of the appended claims.

PATENT CLAIMS

1. A method of handling Wireless Session Protocol (WSP) sessions between a wireless communication terminal and a corresponding server, wherein:

- the communication terminal initiates a session by forwarding a request of data to the server, said request comprises an identification of the requested data and a communication terminal identification number provided by the server;
- the server, when receiving a request containing a communication terminal identification number, recalls user profile information from an associated database memory corresponding to said communication terminal identification number, and said user profile information indicates a data format which shall be handled by the communication terminal; and
- the server replies the request by forwarding the requested data in the format defined by the user profile information.

2. A method according to claim 1, wherein

- the communication terminal when initiating a session comprising a header in the request indicating the data format which shall be handed by the communication terminal;
- said server, when receiving a request containing a header, derives the user profile information from this header and stores the user profile information in said database memory and generates an associated communication terminal identification number; and
- said server forwarding the communication terminal identification number to the communication terminal.

3. A method according to claims 1 or 2, wherein the server defines a period of time in which the user profile information is stored in the database memory.

4. A method according to claim 3, wherein the server deletes the user profile information from the database memory upon expiration of said period of time.

5. A method of handling Wireless Session Protocol (WSP) sessions between a wireless communication terminal and a corresponding server, wherein:

- the communication terminal initiates a session by forwarding a request of data to the server, said request comprises an identification of the requested data and a header indicating the data format which shall be handled by the communication terminal;
- the server upon reception of a request generates a communication terminal identification number and stores said header associated with said communication terminal identification number;
- said server replies the request by forwarding the requested data and the communication terminal identification number to the requesting communication terminal;
- said communication terminal stores the communication terminal identification number in a memory.

6. A method according to claim 5, wherein the communication terminal, when later on initiating a session, forwards a request to the server, said requests includes an identification of the requested data and the communication terminal identification number received from the server; and the server upon reception of a request recalls the header from the database memory which corresponds to said communication terminal identification number.

7. A wireless communication network for handling Wireless Session Protocol (WSP) sessions between a wireless communication terminal and a corresponding server connected via said network, comprising;

- means in the communication terminal for initiating a session by forwarding a request of data to the server, said request comprises an identification of the requested data and a communication terminal identification number provided by the server;
- a database memory connected to the server in order to store user profile information based on the communication terminal identification number

received in the request, said user profile information indicates the data format which may be handled by the communication terminal;

- processing means in order to recall the stored user profile information corresponding to the communication terminal identification number and for replying to the request by forwarding the requested data in the format defined by the user profile information via transmission means to the communication terminal.

8. A network according to claim 7, wherein:

- the communication terminal comprises means for including a header in the request indicating the data format which shall be handled by the communication terminal; and
- the processing means in the server is arranged to derive the user profile information from the header, to store the user profile information in said database memory, to generate an associated communication terminal identification number; and to forward the communication terminal identification number via said transmission means to the communication terminal.

9. A network according to claim 8, wherein the server comprises a timer and said processing means sets a period of time in which the user profile information is stored in the database memory.

10. A network according to claim 9, wherein the processing means, upon expiration of said period of time, deletes the user profile information from the database memory.

11. A server unit for use in a wireless communication network for supporting Wireless Session Protocol (WSP) sessions, comprising:

- input means;
- output means;

- processing means controlling the input and output means and a database memory;
- said database memory contains user profile information for a plurality of communication terminals, said user profile information indicates the data format which may be handled by the communication terminal;
- said input means are adapted to receive a request for data from a communication terminal, said request initiates a session and comprises an identification of the requested data and a communication terminal identification number;
- said processing means recalls the stored user profile information by means of the communication terminal identification number received in the request; and
- said processing means replies to the request by forwarding the requested data in the format defined by the user profile information via said output means.

12. A server according to claim 11, and said communication terminal includes a header in the request indicating the data format which may be handled by the communication terminal, wherein:

- the processing means derives the user profile information from the header, stores the user profile information in said database memory, and generates an associated communication terminal identification number; and
- said processing means forwards the communication terminal identification number via said output means to the communication terminal.

13. A server according to claims 11 or 12, and furthermore comprising a timer, wherein said processing means sets a period of time in which the user profile information is stored in the database memory.

14. A server according to claim 13, wherein the processing means, upon expiration of said period of time, deletes the user profile information from the

database memory.

A method of and a network for handling Wireless Session Protocol (WSP) sessions.

ABSTRACT.

A communication terminal initiates a Wireless Session Protocol (WSP) sessions by forwarding a request of data to a server. The request comprises an identification of the requested data and a communication terminal identification number provided by the server. The server, when receiving a request containing a communication terminal identification number, recalls user profile information from an associated database memory corresponding to said communication terminal identification number. The user profile information indicates a data format which shall be handled by the communication terminal. Then the server replies the request by forwarding the requested data in the format defined by the user profile information.

Fig. 2.

Fig.1

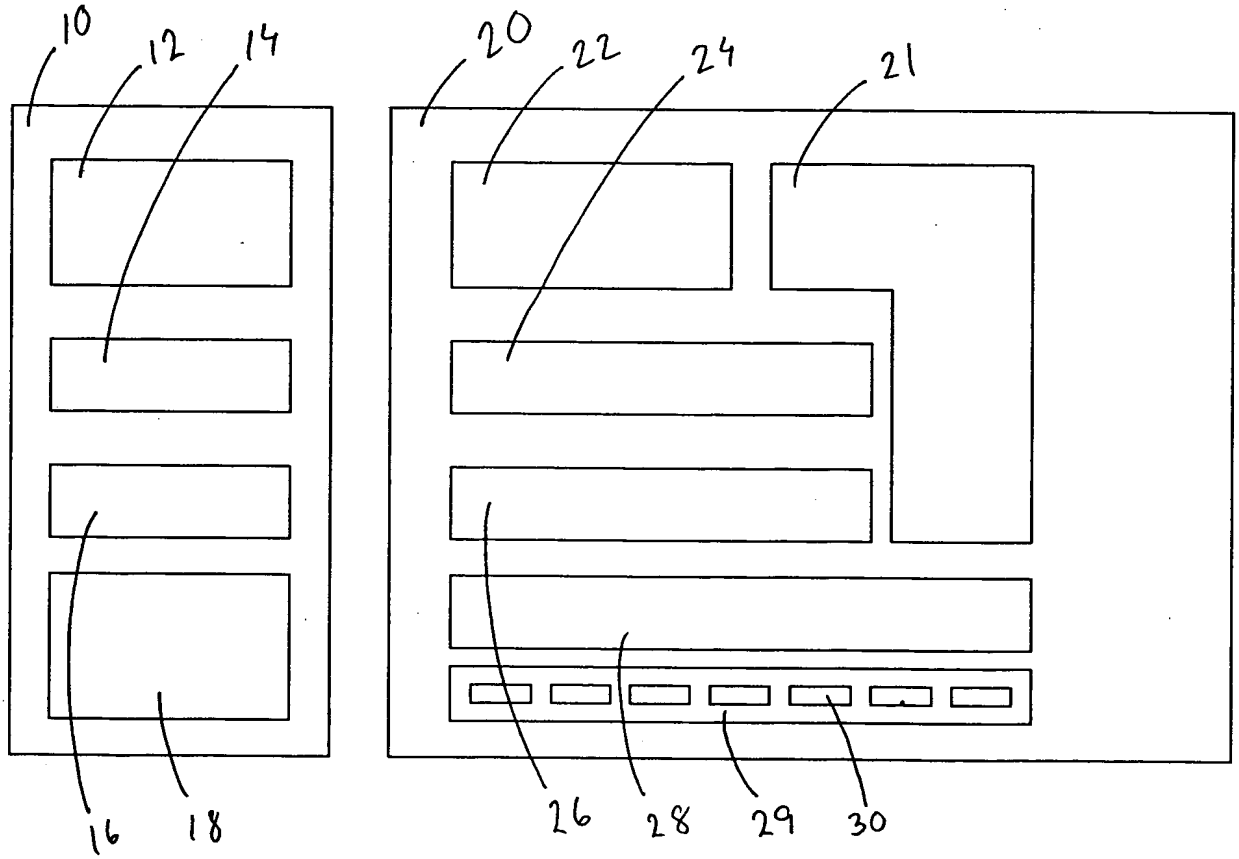
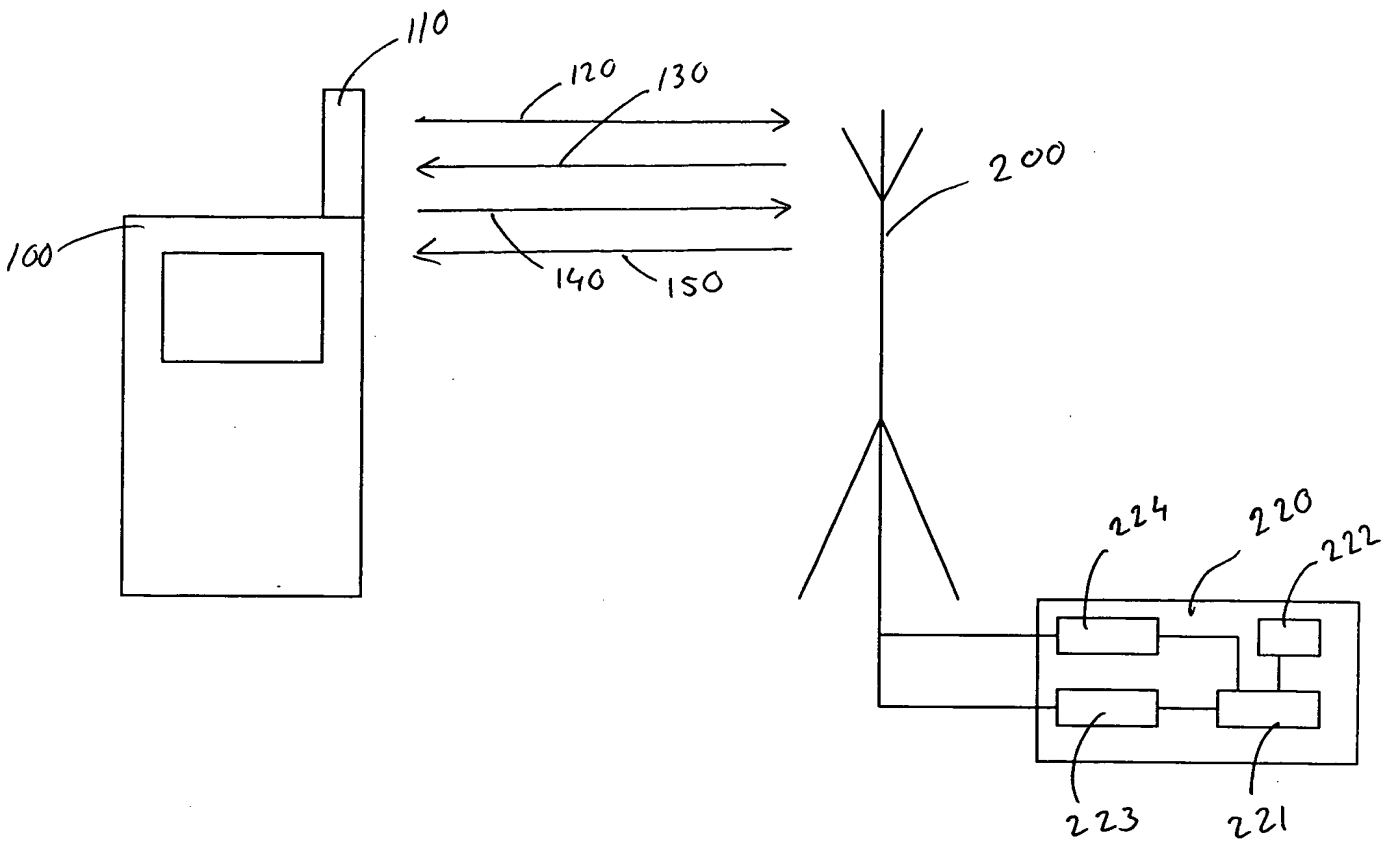


Fig.2



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